

SmartMedia™ Logical Format Specifications

Web-Online Version 1.00

Issued: May 19, 1999

SSFDC Forum Technical Committee

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Revision History

Version			Date
1.00	Web-Online Version	Formal release	May,1999

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0. Introduction

This document covers the SmartMedia™ (SSFDC or Solid State Floppy Disk Card) logical format specifications that are recommended by the SSFDC Forum.

1. Outline of Logical Formats

The DOS•FAT format is recommended as the logical format for SmartMedia™.

Adoption of this format ensures data compatibility among different models.

The following parameters are required for the DOS•FAT format:

- 1) CHS parameters
- 2) Master boot sector
- 3) Partition setup

1.1. CHS Parameters

Since the DOS•FAT format originated from the formats of disk media (floppy disks and hard disks), it requires C-H-S parameters (cylinders (tracks), heads/track, sectors/head).

To maintain data compatibility, these parameters must be the same.

These parameters are defined in the “SmartMedia™ Physical Format Specifications,” and take on the values that are given in Table 1-1.

When using the DOS•FAT format, do not specify any values other than those listed in the table.

Table 1-1 Format Parameters

Capacity	1 MB	2 MB	4 MB	8 MB
Number of cylinders	125	125	250	250
Number of heads per track	4	4	4	4
Number of sectors per head	4	8	8	16
Total number of sectors	2,000	4,000	8,000	16,000
Sector size (bytes)	512	512	512	512

1.2. Master Boot Sector

The master boot sector is located in the first sector. Table 1-2 represents the data arrangement. Data should be laid out in a single partition configuration (Partitions 2 to 4 not used). The boot command area should not be utilized, i.e., there should not be any data or commands written in this area.

Table 1-2 Data Arrangement

Offset	Parameter	
000h–1BDh	Boot command (Not in use)	
1BEh	Partition 1	Boot ID
1BFh		Start head No.
1C0h		Start sector No.
1C1h		Start cylinder No.
1C2h		System ID
1C3h		End head No.
1C4h		End sector No.
1C5h		End cylinder No.
1C6h–1C9h		Start logical sector No.
1CAh–1CDh		Partition size
1CEh–1DDh	Partition 2 (Not in use)	
1DEh–1EDh	Partition 3 (Not in use)	
1EEh–1FDh	Partition 4 (Not in use)	
1FEh–1FFh	Fixed data (Signature)	

(Note) Bit 6 and bit 7 of the sector No. are used for the 2 upper bits of the cylinder No.

1.3. Partition Setup

Each partition has a partition boot sector at its top where the type of FAT system, cluster size, number of directory entries, and other setup information of the partition is recorded. The partition boot sector is followed by a FAT table area, root directory area, and a data area. Table 1-3 shows the data arrangement.

Table 1-3 Data Arrangement

Logical Sector	Area Name
0	Master boot sector
1–	Not in use
Partition top sector	Partition boot sector
.	FAT area
.	FAT area (Copy)
.	Root directory area
.	Data area
.	
Partition end sector	

2. Logical Format Specifications

To facilitate efficient data writing, the Logical Format Specifications adopt a logical format (Table 2-1) with the cluster size and the cluster starting position taken into account. In normal operation, it is recommended that initialization be performed according to these format specifications.

The initial data for the format is as follows:

For parameters, see PC Card Standard Vol. 7, 'Media Storage Formats Specification.'

Table 2-1 Logical Format Specifications

	1 MB	2 MB	4 MB	8 MB
Master boot sector	0	0	0	0
Not in use	1–12	1–10	1–26	1–24
Partition boot sector	13	11	27	25
FAT area	14	12–13	28–29	26–28
FAT area (Copy)	15	14–15	30–31	29–31
Root directory area	16–31	16–31	32–47	32–47
Storing Area	32– 1,999	32– 3,999	48– 7,999	48– 15,999
FAT system	12 bit FAT	12 bit FAT	12 bit FAT	12 bit FAT
Number of directory entries	256	256	256	256
Cluster size	4 KB	4 KB	8 KB	8 KB
Total number of clusters	246	496	497	997
Format capacity	984 KB	1,984 KB	3,976 KB	7,976 KB

2.1. 1 MB

- DOS 12-bit FAT format
- Cluster size : 4 KB
- Total number of clusters : 246
- Number of directory entries : 256

Table 2-3 Logical Format Specifications

Logical Sector No.	Area Name	Initial Set Data
0	Master boot sector	Table 2-4
1–12	Not in use	“FFh, –, FFh” (Area not in use)
13	Partition boot sector	Table 2-5
14	FAT area	“F8h, FFh, FFh, 00h, –, 00h”
15	FAT area (Copy)	“F8h, FFh, FFh, 00h, –, 00h”
16–31	Root directory area	“00h, –, 00h”
32–1,999	Data area	“FFh, –, FFh” (Area not in use)

Table 2-4 Contents of Master Boot Sector

Offset	Parameter		Data
000h–1BDh	Boot command (Not in use)		“00h, –, 00h” (Note1)
1BEh	Partition 1	Boot ID	“80h”
1BFh		Start head No.	“03h”
1C0h		Start sector No.	“02h”
1C1h		Start cylinder No.	“00h”
1C2h		System ID	“01h”
1C3h		End head No.	“03h”
1C4h		End sector No.	“04h”
1C5h		End cylinder No.	“7Ch”
1C6h–1C9h		Start logical sector No.	“0000 000Dh”
1CAh–1CDh		Partition size	“0000 07C3h”
1CEh–1DDh	Partition 2 (Not in use)		“00h, –, 00h”
1DEh–1EDh	Partition 3 (Not in use)		“00h, –, 00h”
1EEh–1FDh	Partition 4 (Not in use)		“00h, –, 00h”
1FEh–1FFh	Fixed data (Signature)		“AA55h”

Note 1: These values are default format values at shipment from the production site. The user can alter the settings.

Table 2-5 Contents of Partition Boot Sector

Offset	Parameter	Data
000h–002h	Jump command	“E9h”, “0000h” (Note1)
003h–00Ah	Manufacturer’s name and version (ASCII, 8 Bytes)	‘ ‘ (Note2)
00Bh–00Ch	Number of bytes per sector	“0200h”
00Dh	Number of sectors per allocation unit	“08h”
00Eh–00Fh	Number of reserved sectors	“0001h”
010h	Number of FATs (File Allocation Tables)	“02h”
011h–012h	Number of root directory entries	“0100h”
013h–014h	Total number of partition sectors	“07C3h”
015h	ID Byte	“F8h”
016h–017h	Number of FAT sectors	“0001h”
018h–019h	Number of sectors per track	“0004h”
01Ah–01Bh	Number of heads	“0004h”
01Ch–01Fh	Number of hidden sectors	“0000 000Dh”
020h–023h	Total number of partition sectors (32 Bits)	“0000 0000h”
024h	Physical drive No.	“00h”
025h	Reserved	“00h”
026h	Extended boot record signatures	“00h”
027h–02Ah	Volume ID (4 Bytes)	“0000 0000h”
02Bh–035h	Volume label (ASCII, 11 Bytes)	“00h, –, 00h”
036h–03Dh	File system type (ASCII, 8 Bytes)	‘FAT12 ‘
03Eh–1FDh	Reserved (IPL code area)	“00h, –, 00h”
1FEh–1FFh	Fixed data (Signature)	“AA55h”

Note 1: These values are default format values at shipment from the production site. The user can alter the settings.

Note 2: These values are default format values at shipment from the production site. When format commands in Windows® 95 and 98 are used, these values may be different.

2.2. 2 MB

- DOS 12-Bit FAT format
- Cluster size : 4 KB
- Total number of clusters : 496
- Number of directory entries : 256

Table 2-6 Logical Format Specifications

Logical Sector No.	Area Name	Initial Set Data
0	Master boot sector	Table 2-7
1–10	Not in use	“FFh, –, FFh” (Area not in use)
11	Partition boot sector	Table 2-8
12	FAT area	“F8h, FFh, FFh, 00h, –, 00h”
13		“00h, –, 00h”
14	FAT area (Copy)	“F8h, FFh, FFh, 00h, –, 00h”
15		“00h, –, 00h”
16–31	Root directory area	“00h, –, 00h”
32–3,999	Data area	“FFh, –, FFh” (Area not in use)

Table 2-7 Contents of Master Boot Sector

Offset	Parameter		Data
000h–1BDh	Boot command (Not in use)		“00h, –, 00h” (Note1)
1BEh	Partition 1	Boot ID	“80h”
1BFh		Start head No.	“01h”
1C0h		Start sector No.	“04h”
1C1h		Start cylinder No.	“00h”
1C2h		System ID	“01h”
1C3h		End head No.	“03h”
1C4h		End sector No.	“08h”
1C5h		End cylinder No.	“7Ch”
1C6h–1C9h		Start logical sector No.	“0000 000Bh”
1CAh–1CDh		Partition size	“0000 0F95h”
1CEh–1DDh	Partition 2 (Not in use)		“00h, –, 00h”
1DEh–1EDh	Partition 3 (Not in use)		“00h, –, 00h”
1EEh–1FDh	Partition 4 (Not in use)		“00h, –, 00h”
1FEh–1FFh	Fixed data (Signature)		“AA55h”

Note 1: These values are default format values at shipment from the production site. The user can alter the settings.

Table 2-8 Contents of Partition Boot Sector

Offset	Parameter	Data
000h–002h	Jump command	“E9h”, “0000h” (Note1)
003h–00Ah	Manufacturer’s name and version (ASCII, 8 Bytes)	‘ ‘ (Note2)
00Bh–00Ch	Number of bytes per sector	“0200h”
00Dh	Number of sectors per allocation unit	“08h”
00Eh–00Fh	Number of reserved sectors	“0001h”
010h	Number of FATs (File Allocation Tables)	“02h”
011h–012h	Number of root directory entries	“0100h”
013h–014h	Total number of partition sectors	“0F95h”
015h	ID Byte	“F8h”
016h–017h	Number of FAT sectors	“0002h”
018h–019h	Number of sectors per track	“0008h”
01Ah–01Bh	Number of heads	“0004h”
01Ch–01Fh	Number of hidden sectors	“0000 000Bh”
020h–023h	Total number of partition sectors (32 Bits)	“0000 0000h”
024h	Physical drive No.	“00h”
025h	Reserved	“00h”
026h	Extended boot record signature	“00h”
027h–02Ah	Volume ID (4 bytes)	“0000 0000h”
02Bh–035h	Volume label (ASCII, 11 Bytes)	“00h, –, 00h”
036h–03Dh	File system type (ASCII, 8 Bytes)	‘FAT12 ‘
03Eh–1FDh	Reserved (IPL code area)	“00h, –, 00h”
1FEh–1FFh	Fixed data (Signature)	“AA55h”

Note 1: These values are default format values at shipment from the production site. The user can alter the settings.

Note 2: These values are default format values at shipment from the production site. When format commands in Windows® 95 and 98 are used, these values may be different.

2.3. 4 MB

- DOS 12-bit FAT format
- Cluster size : 8 KB
- Total number of clusters : 497
- Number of directory entries : 256

Table 2-9 Logical Format Specifications

Logical Sector No.	Area Name	Initial Set Data
0	Master boot sector	Table 2-10
1–26	Not in use	“FFh, –, FFh” (Area not in use)
27	Partition boot sector	Table 2-11
28	FAT area	“F8h, FFh, FFh, 00h, –, 00h”
29		“00h, –, 00h”
30	FAT area (Copy)	“F8h, FFh, FFh, 00h, –, 00h”
31		“00h, –, 00h”
32–47	Root directory area	“00h, –, 00h”
48–7,999	Data area	“FFh, –, FFh” (Area not in use)

Table 2-10 Contents of Master Boot Sector

Offset	Parameter		Data
000h–1BDh	Boot command (Not in use)		“00h, –, 00h” (Note1)
1BEh	Partition 1	Boot ID	“80h”
1BFh		Start head No.	“03h”
1C0h		Start sector No.	“04h”
1C1h		Start cylinder No.	“00h”
1C2h		System ID	“01h”
1C3h		End head No.	“03h”
1C4h		End sector No.	“08h”
1C5h		End cylinder No.	“F9h”
1C6h–1C9h		Start logical sector No.	“0000 001Bh”
1CAh–1CDh		Partition size	“0000 1F25h”
1CEh–1DDh	Partition 2 (Not in use)		“00h, –, 00h”
1DEh–1EDh	Partition 3 (Not in use)		“00h, –, 00h”
1EEh–1FDh	Partition 4 (Not in use)		“00h, –, 00h”
1FEh–1FFh	Fixed data (Signature)		“AA55h”

Note 1: These values are default format values at shipment from the production site. The user can alter the settings.

Table 2-11 Contents of Partition Boot Sector

Offset	Parameter	Data
000h–002h	Jump command	“E9h”, “0000h” (Note1)
003h–00Ah	Manufacturer’s name and version (ASCII, 8 Bytes)	‘ ‘ (Note2)
00Bh–00Ch	Number of bytes per sector	“0200h”
00Dh	Number of sectors per allocation unit	“10h”
00Eh–00Fh	Number of reserved sectors	“0001h”
010h	Number of FATs (File Allocation Tables)	“02h”
011h–012h	Number of root directory entries	“0100h”
013h–014h	Total number of partition sectors	“1F25h”
015h	ID Byte	“F8h”
016h–017h	Number of FAT sectors	“0002h”
018h–019h	Number of sectors per track	“0008h”
01Ah–01Bh	Number of heads	“0004h”
01Ch–01Fh	Number of hidden sectors	“0000 001Bh”
020h–023h	Total number of partition sectors (32 Bits)	“0000 0000h”
024h	Physical drive No.	“00h”
025h	Reserved	“00h”
026h	Extended boot record signatures	“00h”
027h–02Ah	Volume ID (4 Bytes)	“0000 0000h”
02Bh–035h	Volume label (ASCII, 11 Bytes)	“00h, –, 00h”
036h–03Dh	File system type (ASCII, 8 Bytes)	‘FAT12 ‘
03Eh–1FDh	Reserved (IPL code area)	“00h, –, 00h”
1FEh–1FFh	Fixed data (Signature)	“AA55h”

Note 1: These values are default format values at shipment from the production site. The user can alter the settings.

Note 2: These values are default format values at shipment from the production site. When format commands in Windows® 95 and 98 are used, these values may be different.

2.4. 8 MB

- DOS 12-bit FAT format
- Cluster size : 8 KB
- Total number of clusters : 997
- Number of directory entries : 256

Table 2-12 Logical Format Specifications

Logical Sector No.	Area Name	Initial Set Data
0	Master boot sector	Table 2-13
1–24	Not in use	“FFh, –, FFh” (Area not in use)
25	Partition boot sector	Table 2-14
26	FAT area	“F8h, FFh, FFh, 00h, –, 00h”
27–28		“00h, –, 00h”
29	FAT area (Copy)	“F8h, FFh, FFh, 00h, –, 00h”
30–31		“00h, –, 00h”
32–47	Root directory area	“00h, –, 00h”
48–15,999	Data area	“FFh, –, FFh” (Area not in use)

Table 2-13 Contents of Master Boot Sector

Offset	Parameter		Data
000h–1BDh	Boot command (Not in use)		“00h, –, 00h” (Note1)
1BEh	Partition 1	Boot ID	“80h”
1BFh		Start head No.	“01h”
1C0h		Start sector No.	“0Ah”
1C1h		Start cylinder No.	“00h”
1C2h		System ID	“01h”
1C3h		End head No.	“03h”
1C4h		End sector No.	“10h”
1C5h		End cylinder No.	“F9h”
1C6h–1C9h		Start logical sector No.	“0000 0019h”
1CAh–1CDh		Partition size	“0000 3E67h”
1CEh–1DDh	Partition 2 (Not in use)		“00h, –, 00h”
1DEh–1EDh	Partition 3 (Not in use)		“00h, –, 00h”
1EEh–1FDh	Partition 4 (Not in use)		“00h, –, 00h”
1FEh–1FFh	Fixed data (Signature)		“AA55h”

Note 1: These values are default format values at shipment from the production site. The user can alter the settings.

Table 2-14 Contents of Partition Boot Sector

Offset	Parameter	Data
000h–002h	Jump command	“E9h”, “0000h” (Note1)
003h–00Ah	Manufacturer’s name and version (ASCII, 8 Bytes)	‘ ‘ (Note2)
00Bh–00Ch	Number of bytes per sector	“0200h”
00Dh	Number of sectors per allocation unit	“10h”
00Eh–00Fh	Number of reserved sectors	“0001h”
010h	Number of FATs (File Allocation Tables)	“02h”
011h–012h	Number of root directory entries	“0100h”
013h–014h	Total number of partition sectors	“3E67h”
015h	ID Byte	“F8h”
016h–017h	Number of FAT sectors	“0003h”
018h–019h	Number of sectors per track	“0010h”
01Ah–01Bh	Number of heads	“0004h”
01Ch–01Fh	Number of hidden sectors	“0000 0019h”
020h–023h	Total number of partition sectors (32 Bits)	“0000 0000h”
024h	Physical drive No.	“00h”
025h	Reserved	“00h”
026h	Extended boot record signatures	“00h”
027h–02Ah	Volume ID (4 Bytes)	“0000 0000h”
02Bh–035h	Volume label (ASCII, 11 Bytes)	“00h, –, 00h”
036h–03Dh	File system type (ASCII, 8 Bytes)	‘FAT12 ‘
03Eh–1FDh	Reserved (IPL code area)	“00h, –, 00h”
1FEh–1FFh	Fixed data (Signature)	“AA55h”

Note 1: These values are default format values at shipment from the production site. The user can alter the settings.

Note 2: These values are default format values at shipment from the production site. When format commands in Windows® 95 and 98 are used, these values may be different.